TRANSMIT LOGIC UNIT (TLU), 628020

GENERAL DESCRIPTION

CONTENTS PAGE

1. GENERAL 1
2. DESCRIPTION 1
3. FUNCTIONAL OPERATION (FIG. 2) 1
DATA TRANSMISSION 1
MULTIPLEXING 2
FRAME GENERATION 2
CCIS OPERATION 3
4. OPTIONS 3
5. SPECIAL FEATURES 3
6. TEST AND MAINTENANCE FEATURES 3
7. TECHNICAL SUMMARY 3
8. REPLACEABLE PARTS 4
9. REFERENCES 4

1. GENERAL

1.01 This Section provides a general description of the ITT D448 transmit logic unit (TLU), 628020 (Fig. 1), to the functional block diagram level.

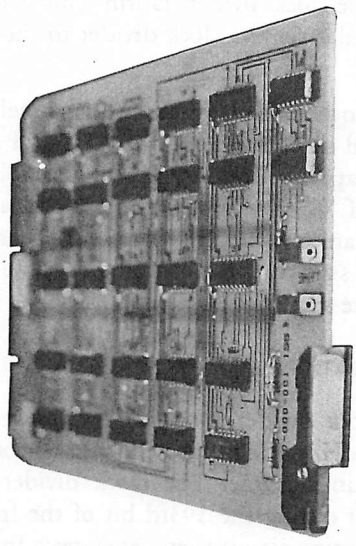


Fig. 1—TLU, 628020

1.02 Whenever this Section is reissued, the reasons for reissue will be listed in this paragraph.

1.03 The TLU multiplexes individual channel information from the channel units and adds framing information to the resulting data stream.

2. DESCRIPTION

2.01 The unit mounts in the D448 multiplex shelf (common equipment mounting section) in connector J9C (for Digroup A) or J12C (for Digroup B). Installation procedures for the unit are provided in Section ITTR-18-431 (for Mode 1 operation), ITTR-18-432 (for Mode 2 operation), or ITTR-18-433 (for Mode 3 operation).

2.02 The unit is available in Group -0 only.

2.03 The unit consists of an epoxy-glass printed circuit board (PCB) and associated circuit components. The lower front edge of the PCB is fitted with a handle to facilitate insertion and removal of the unit from the shelf. An identification strip on the handle face indicates the unit mnemonic (TLU), last three digits of the model number, last three digits of the part number, and issue letter. The part number and issue letter are also located on the component side of the PCB.

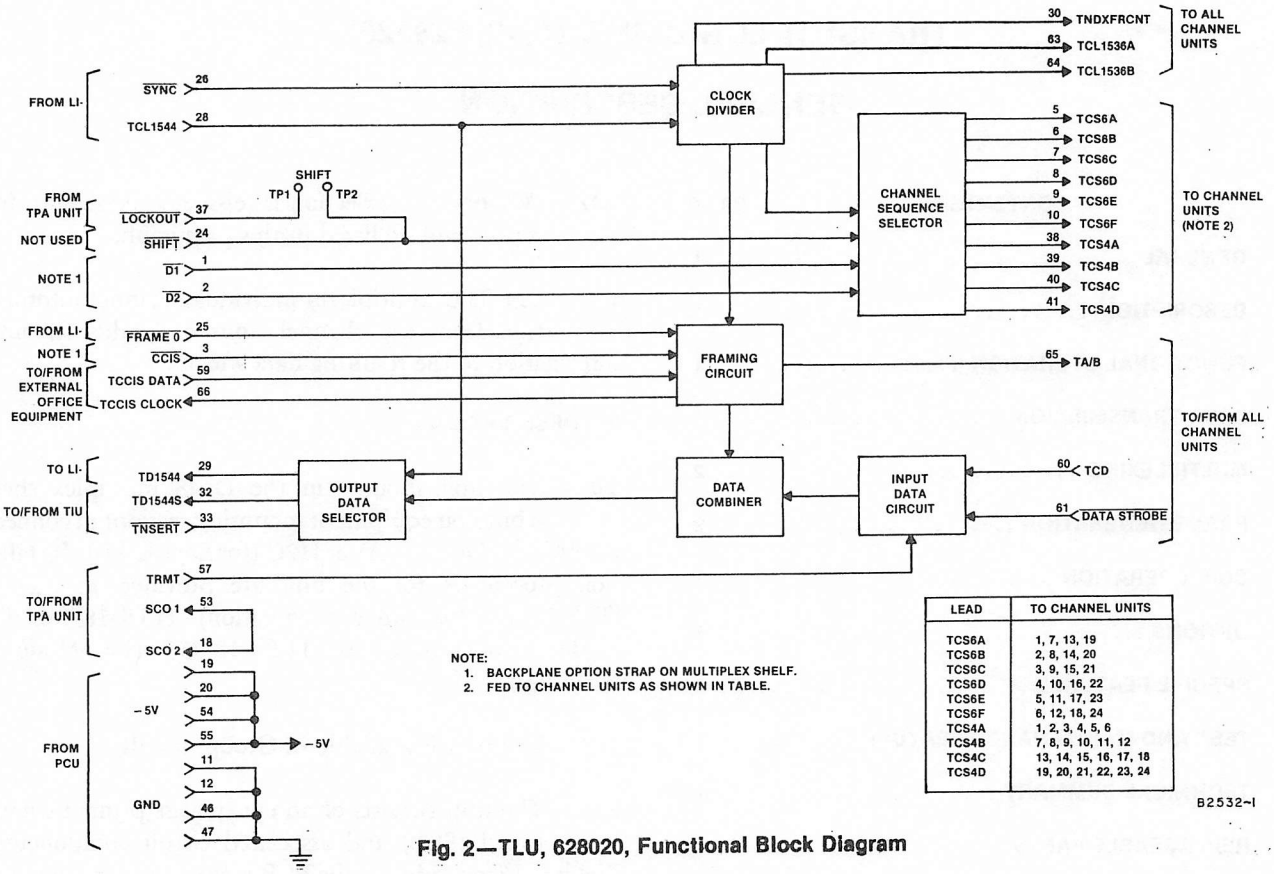
2.04 The SHIFT test points (TP1 and TP2) are located on the front edge of the PCB.

2.05 Printed circuit wiring is etched on both sides of the PCB. The unit inputs and outputs are terminated in gold-plated contacts on the rear edge of the PCB. These contacts mate with a 70-pin contact edge connector on the rear of the multiplex shelf.

3. FUNCTIONAL OPERATION (FIG. 2)

DATA TRANSMISSION

3.01 Unipolar data from the channel units is applied to the input data circuit on the TCD lead. The input data circuit passes this data to the data combiner for processing. If the input data circuit receives an 8-bit word that is all 0s, it forces bit 7 of that word to a 1, unless the $\overline{\text{DATA STROBE}}$ lead is low. If the input data circuit receives a local alarm indication from the trunk processor



LEAD	TO CHANNEL UNITS
TCS6A	1, 7, 13, 19
TCS6B	2, 8, 14, 20
TCS6C	3, 9, 15, 21
TCS6D	4, 10, 16, 22
TCS6E	5, 11, 17, 23
TCS6F	6, 12, 18, 24
TCS4A	1, 2, 3, 4, 5, 6
TCS4B	7, 8, 9, 10, 11, 12
TCS4C	13, 14, 15, 16, 17, 18
TCS4D	19, 20, 21, 22, 23, 24

Fig. 2—TLU, 628020, Functional Block Diagram

and alarm (TPA) unit (TRMT lead low), it forces all bit 2s to 0. This is recognized by the far-end terminal as a remote alarm indication.

3.02 The data combiner inserts framing bits, generated in the framing circuit, in the bit stream from the input data circuit. The resulting data (193-bit frame) is passed to the output data selector.

3.03 The data applied to the output data selector is normally passed through to the line interface (LI-) unit on the TD1544 lead. However, when the test interface unit (TIU) sets the TNSERT lead low, the output data selector passes data to the automated test and alignment unit (ATAU) on the TD1544S lead. The data passed to the ATAU consists of only one channel word. After the transmission of one word, the TIU sets the TNSERT lead high and normal data transmission to the LI- is resumed.

MULTIPLEXING

3.04 The output data of the channel units is multiplexed onto the TCD bus by a strobing action of the TLU. This strobing action of the TLU is produced by pulses on the TCS6 and TCS4 leads. These pulses are produced by the channel sequence selector with an input from the clock divider.

3.05 The clock divider receives a 1.544-MHz clock signal from the LI- and pulses the channel sequence selector to identify the 24 channel word times. When pulsed by the clock divider, the channel sequence selector places strobe pulses on one TCS6 lead and one TCS4 lead. The channel unit associated with those leads is gated on to transmit one 8-bit word to the TLU. The channel unit clocks out the data under control of the 1.536-MHz clock produced by the clock divider. During Mode 1 operation, the SYNC lead locks the clock divider to the LI-1 frame counter.

3.06 The sequence in which the channel units are sampled is controlled by the D1 and D2 leads, which are strapping options on the backplane of the multiplex shelf. With neither of the options strapped, the channel units are sampled in the D3 sequence. With one of the options strapped, the channel units are sampled in the appropriate sequence as selected (D1D or D2).

FRAME GENERATION

3.07 The clock divider produces 193 pulses from the 1.544-MHz clock from the LI- which correspond to the 193 bits in a frame. The clock divider pulses the framing circuit during the 193rd bit of the frame (frame time). The framing circuit then generates a frame bit and applies it to the data combiner where it is inserted in the

bit stream with the channel unit information. During Mode 1 operation, the $\overline{\text{FRAME 0}}$ lead synchronizes the frame divider to the frame divider of the LI-1.

3.08 The framing circuit also identifies the signaling frames for the channel units. The channel units are signaled on the TA/B lead when the signaling frame will be occurring. The channel units can then add their signaling information to the transmitted data.

CCIS OPERATION

3.09 When the terminal uses common channel interoffice signaling (CCIS), the framing circuit replaces every other framing bit with a CCIS bit and transmits CCIS clock to external office equipment.

3.10 The framing circuit identifies the presence of CCIS operation from the $\overline{\text{CCIS}}$ lead. The $\overline{\text{CCIS}}$ lead is a strapping option on the backplane of the multiplex shelf.

4. OPTIONS

4.01 This unit has no field-selectable options. However, there are options on the backplane of the multiplex shelf which affect the operation of this unit. Refer to Section ITTR-18-405 for option selection information on these options.

5. SPECIAL FEATURES

5.01 If the TLU is removed from the multiplex shelf while the terminal is in service, a local alarm will occur. The SCO loop on the unit is fed to the TPA unit and if that loop opens, the TPA unit causes a local alarm.

6. TEST AND MAINTENANCE FEATURES

6.01 This unit has SHIFT test points, TP1 and TP2. The insertion of a shorting plug into the test points shifts channel unit outputs into different channel unit inputs to allow looped terminal testing of 2-wire channel units. The channel unit shifting is shown in Table A. Refer to Fig. 1 for the physical location of the test points.

TABLE A

TRANSMIT CHANNEL	RECEIVE CHANNEL D1D OPERATION	D2 OPERATION	D3 OPERATION
1	7	2	13
2	8	1	14
3	9	4	15
4	10	3	16
5	11	6	17
6	12	5	18

TABLE A (CONT)

TRANSMIT CHANNEL	RECEIVE CHANNEL D1D OPERATION	D2 OPERATION	D3 OPERATION
7	1	8	19
8	2	7	20
9	3	10	21
10	4	9	22
11	5	12	23
12	6	11	24
13	19	14	1
14	20	13	2
15	21	16	3
16	22	15	4
17	23	18	5
18	24	17	6
19	13	20	7
20	14	19	8
21	15	22	9
22	16	21	10
23	17	24	11
24	18	23	12

7. TECHNICAL SUMMARY

7.01 A summary of the technical specifications for the unit is given in Table B.

TABLE B

ITEM	SPECIFICATION
DC POWER	
Voltage Current	−5.0 ±0.25 Vdc 500 mA, maximum
OPERATING ENVIRONMENT	
Temperature Humidity Altitude	0° to +55°C To 95% at 40°C (no condensation) To 14,000 ft (4,267 m)
DIMENSIONS	
Height Width Depth	5.0 in. (12.7 cm) 0.5 in. (1.3 cm) 9.6 in. (24.4 cm)
WEIGHT	0.4 lb (0.2 kg)

8. REPLACEABLE PARTS

8.01 This unit has no field-replaceable parts.

9. REFERENCES

9.01 The engineering drawings noted in Table C were used in the preparation of this Section.

TABLE C

TYPE	DRAWING NO.
Assembly Schematic	628020-000 628020-002

9.02 Related information on the TLU may be found in the ITTR Sections referenced in Table D.

TABLE D

TITLE	SECTION NO.
Connectorized Multiplex Shelf (MS/WC7, MS/WC5, MS/C7 and MS/C6), 618001, 628005, 628011 and 628015 — General Description	ITTR-18-005
Connectorized Multiplex Shelf (MS/WC7, MS/WC5, MS/C7 and MS/C6), 628001, 628005, 628011 and 628015 — Option Selection, Installation and Pretest	ITTR-18-405
Mode 1 Common Equipment — Installation and Pretest	ITTR-18-431
Mode 2 Common Equipment — Installation and Pretest	ITTR-18-432
Mode 3 Common Equipment — Installation and Pretest	ITTR-18-433